IR024(2)

U.S. Environmental Protection Agency
Region VIII
Hazardous Waste Management Division
Five-year Review (Type Ia)

Monticello Mill Tailings Site (San Juan County, Utah)

I. Introduction

Authority Statement. Purpose. This review was conducted pursuant to Comprehensive Environmental Response, Compensation, and Liability (CERCLA) section 121(c), National Contingency Plan (NCP) section 300.430(f)(4)(ii), and Office of Solid Waste and Emergency Response (OSWER) Directives 9355.7-02 (May 23, 1991) and 9355.7-02A (July 26, 1994). The U.S. Department of Energy (DOE) Grand Junction Office (GJO) conducted the review for the U.S. Environmental Protection Agency (EPA) Region VIII in accordance with the Monticello Site Federal Facilities Agreement (FFA), dated December 1988, and with Executive Order 12580. This is a statutory review. The purpose of a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become a part of the Site File. This review (Type Ia) is applicable to a site at which response is ongoing. This document covers the first five-year period from August 1991, when remedial action started, through December 1996.

Site Characteristics. Contamination at Monticello resulted from the storage and milling of vanadium and uranium ores between 1940 and 1961. A government-owned mill and ore-buying station formerly occupied part of the Montezuma Creek valley and adjoining hillsides at the south edge of town (Figure 1). The millsite includes four stabilized tailings impoundments (the Carbonate, Vanadium, Acid, and East piles) and an area once occupied by the mill buildings. Extensive radiological and heavy-metal contamination of these areas resulted directly from ore storage and processing. Adjoining properties have lesser degrees of contamination transported by wind, water, or human action. Contaminants derived from the millsite also affect surface water, groundwater, and alluvial sediments along downstream reaches of Montezuma Creek.

The primary ore- and tailings-borne contaminants are radionuclides in the uranium decay series, particularly thorium-230, radium-226, radon-222, and daughters of radon-222. These occur mostly in byproduct material, as defined in the Atomic Energy Act of 1954. Significant exposure pathways affecting human health include:

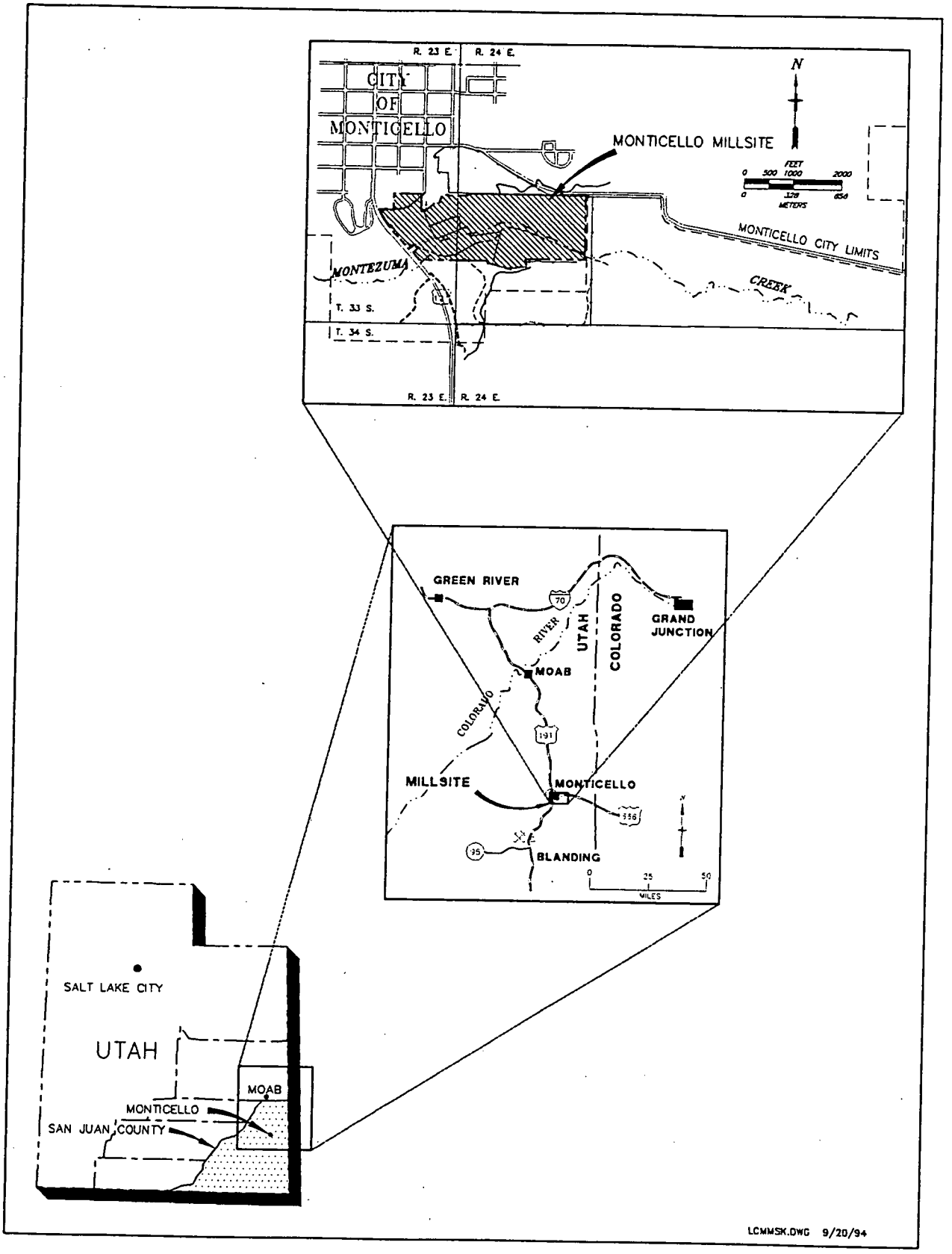

Figure 1
Monticello Millsite Location

- Inhalation of radon-222 and its daughters, which emit alpha radiation;
- External whole-body exposure to radionuclides that emit gamma radiation; and
- Inhalation and ingestion of dust containing thorium-230 and radium-226, which emit alpha and gamma radiation.

Other contaminants include arsenic, beryllium, cadmium, chromium, copper, lead, molybdenum, nickel, uranium, selenium, vanadium, and zinc. These elements either occur naturally in uranium ores or were contributed by the milling processes.

Under CERCLA and the FFA, DOE is the responsible party for remediating the three operable units of the Monticello Mill Tailings Site. Operable Unit (OU) I includes the tailings and other contaminated property at the millsite. OU II includes the contaminated peripheral properties adjacent to the millsite, and downstream along Montezuma Creek. OU III consists of the contaminated surface water and groundwater and sediments along Montezuma Creek. The site was placed on the National Priorities List in November 1989, and a Record of Decision (ROD) for OU I and OU II was signed in September 1990. OU III was not included in the 1990 ROD because remedial actions at OUs I and II will likely alter the extent and distribution of contamination in OU III. A remedial investigation/feasibility study is being conducted for OU III with a ROD expected in late 1998 or early 1999.

II. Discussion of Chosen Remedies, Remedial Objectives, and Areas of Noncompliance

Operable Unit I—Millsite Tailings and Millsite Property. OU I consists of the four tailings impoundments and the main area where milling operations were conducted. Approximately 2.2 million cubic yards of contaminated material will ultimately be removed from OU I and placed in an on-site repository. Construction of the repository is administratively a part of OU I, although it also will be used to dispose of materials from OU II, possibly OU III, and the Monticello Vicinity Properties Site. Remedial action began in 1991 with the abandonment of several unused water wells. Construction of support and control facilities, including limited removal of mill tailings, began in 1992 and continued during the 1993 through 1995 construction seasons. The repository design was completed in August 1995 and construction of the repository commenced in November 1995. The repository has been excavated and placement of the liner system was completed in the fall of 1996.

The selected remedy included a repository located south of the millsite, conforming to design guidelines developed pursuant to the Uranium Mill Tailings Radiation Control Act of 1978. Design of the repository had already begun when the discovery of groundwater at shallow depth beneath the site forced major revisions to this design concept. A single-lined repository design was submitted in April 1993. However, concerns about the degree of

protectiveness obtainable by a single-liner design and about increased project costs caused DOE to re-evaluate disposal alternatives. DOE, EPA and the State identified two viable alternatives: transport of contaminated materials to an existing facility south of Blanding, Utah, or on-site disposal in a double-lined repository. To support the decision making process, the DOE worked with the community to establish a Site Specific Advisory Board (SSAB). The SSAB was provided information on the alternatives for review. After public input through the SSAB and other community stakeholders, and review of the nine CERCLA evaluation criteria, DOE decided that the on-site repository should remain the selected remedy.

Operable Unit II—Peripheral Properties. OU II includes private- and government-owned properties near the millsite that were contaminated by wind- or stream-deposited tailings or by radioactive material from the ore-buying station. It also includes one property formerly occupied by mill facilities but now owned by the City of Monticello. An estimated 0.3 million cubic yards of contaminated material ultimately will be removed from OU II properties for temporary storage at the millsite.

Remediation of OU II began in 1992. As of December 13, 1996, OU II consisted of 29 properties, 10 of which were being remediated in two or more phases of work. Remedial construction was complete at 5 properties, 2 properties did not require remedial action because of low contamination levels, and the remaining properties were in various stages of design or construction. All or parts of four properties adjacent to the millsite will be remediated as a single unit concurrently with OU I.

Operable Unit III—Surface Water, Ground Water, and Contaminated Sediments in Montezuma Creek Canyon. OU III consists of the contaminated surface water, groundwater, and sediments in Montezuma Creek Canyon downstream from the millsite. However, the ROD of August 1990 did not provide a remedy or specific remedial objectives for OU III. Instead, it deferred remedy selection to a separate remedial investigation/feasibility study (RI/FS) and the signing of a separate ROD, so that the impacts on OU III of remediation at OUs I and II could be evaluated. The RI/FS activities for OU III began in 1995. Remedies for sediments in Montezuma Creek Canyon and surface and groundwater have not been selected.

Schedule for Remediation. The present schedule for completing the remediation of the three operable units is as follows:

Operable Unit	Draft-Final/Document Submittal	Construction Complete	Completion Reports Complete
OU I Millsite Remediation	July 12, 1995	November 30, 1998 (tailings removal)	November 30, 1999
OU I Millsite Restoration	May 29, 1999	July 17, 2001	N/A
OU II	December 30, 1997	November 30, 1998	November 30, 1999
OU III RI	January 2, 1998	N/A	N/A
OU III FS	February 26, 1998	N/A	N/A
OU III Surface & Ground Water	March 23, 1999	April 2, 2030	TBD

(1) Proposed dates in the December 1996 Site Management Plan, Revision 1. These dates are subject to revision as the Site Management Plan is revised.

Remedial Objectives. The main remedial objective for OUs I and II is to excavate tailings and other byproduct material and hazardous substances to levels protective of human health and the environment. A secondary objective for OU I is to dispose of the resulting contaminated materials in an on-site repository; for OU II, it is to store the contaminated materials at an interim repository on the millsite (OU I) pending their permanent disposal in the OU I repository. Most of the contaminated materials from the eight operable units of the Monticello Vicinity Properties Site will also be stored temporarily at the millsite interim repository pending their permanent disposal at the OU I repository. Remedial objectives are not yet defined for OU III.

For radionuclides in byproduct material (as defined in the Atomic Energy Act), the cleanup standards for uranium mill tailings in 40 CFR 192 are considered protective. These standards require that average radium-226 concentrations in soil not exceed the background level by more than 5 picocuries per gram (pCi/g) in the surficial 15 centimeters (cm), or by more than 15 pCi/g in successively deeper 15-cm layers. If these cleanup standards are met, the property concerned can be released for unlimited use and unrestricted exposure. Radon-222 releases from the repository may not exceed an average of 20 picocuries per square meter per second or increase the annual average concentration of radon-222 in air outside the disposal site by more than 0.5 picocuries per liter.

For non-radiological contaminants and radiological contaminants not originating from byproduct materials, cleanup standards remain to be established. Wastes that are not byproduct material will be managed in accordance with DOE's *Special Waste Management Plan*, dated April 1996. Hazardous wastes will be managed in accordance with the Resource Conservation and Recovery Act and the Utah Solid and Hazardous Waste Act, and the regulations implementing them, as required by the Record of Decision.

The DOE, EPA and State have determined that supplemental standards (40 CFR 192.21) may be appropriate at four peripheral properties near the millsite and repository. The moderately sloping hillsides on these properties are wooded with piñon and juniper trees. Remediation costs and environmental impacts may be excessive relative to the benefits gained from remediation for contamination that does not pose a clear present or future risk. Use of supplemental standards requires a long-term management plan and a contingency plan to control the affected properties. Plans and supporting documents for such long-term activities have been developed and submitted to the EPA and the State. On December 23, 1996, the EPA and State concurred, with comment, on the use of supplemental standards. Negotiations on specific issues are underway.

Areas of Noncompliance. In May 1995, the EPA assessed DOE $40,000 in stipulated penalties for violations of Utah Pollutant Discharge Elimination System regulations due to storm water discharges from the millsite. These discharges resulted from the overflow of storm water from two detention ponds, Ponds 2 and 3. The discharge from Pond 2 resulted from incomplete construction of diversion ditches that caused large volumes of storm water to enter the pond, which then overflowed into Montezuma Creek. The discharge from Pond 3 resulted from flows through discharge pipes that had been inadvertently left uncapped during construction. Water quality data for Ponds 2 and 3 indicated that some of the water quality criteria set for waste water discharge by the State of Utah had been exceeded. DOE reported the discharges to EPA and the Utah Department of Environmental Quality and implemented corrective actions, which included completing the diversion ditches, connecting Pond 2 to Pond 3 to prevent overflows, capping the discharge pipes at Pond 3, and expediting start-up of the waste water treatment plant to reduce the volume of stored storm water in the ponds.

III. Recommendations

The following recommendations are made:

1. Continue the ongoing remediation of Operable Units I and II as now planned.

2. Add the Resource Conservation and Recovery Act and the Utah Solid and Hazardous Waste Act, together with appropriate regulations implementing them, to the applicable or relevant and appropriate requirements for the site. These additions reflect the adoption of a double-liner design for the OU I repository and the subsequent decision to allow disposal of non-radiological wastes in the repository.

3. Proceed with the development of the RI/FS to obtain and implement a ROD for Operable Unit III at the earliest practical date.

4. Finish developing the cleanup standards for non-radiological contaminants as a priority task so that the cleanup work in all three operable units is not delayed.

IV. Statement on Protectiveness

I certify that the remedies selected for this site, when fully implemented, will remain protective of human health and the environment.

V. Next Five-Year Review

The next five-year review will be conducted within five years after the date of issue of this report.

Michael K. Tucker

Michael K. Tucker, Acting Manager
U.S. Department of Energy, Grand Junction Office

February 13, 1997
Date